



Clay C. Warren
Chief Operating Officer

June 19, 1997
WO 97-0063

U. S. Nuclear Regulatory Commission
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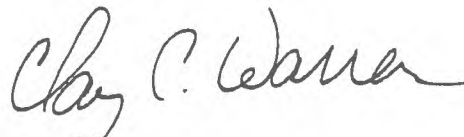
Subject: Docket No. 50-482: Licensee Event Report 97-008-00

Gentlemen:

The attached Licensee Event Report is being submitted pursuant to 10 CFR 50.73 (a) (2) (iv) concerning Engineered Safety Features and Reactor Protection System actuation. This manual actuation was prompted by a steam leak in a non-safety related third stage extraction steam isolation valve.

If you should have any questions regarding this submittal, please contact me at (316) 364-8831 extension 4485, or Mr. Richard D. Flannigan at extension 4500.

Very truly yours,


Clay C. Warren

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PDR ADOCK 05000482
S PDR

CCW/jad

Attachment

cc: W. D. Johnson (NRC), w/a
E. W. Merschoff (NRC), w/a
J. F. Ringwald (NRC), w/a
J. C. Stone (NRC), w/a

IE221



CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9706300017 DOC.DATE: 97/06/19 NOTARIZED: NO DOCKET #
FACIL:STN-50-482 Wolf Creek Generating Station, Wolf Creek Nuclear 05000482
AUTH.NAME . AUTHOR AFFILIATION
FLANNIGAN,R.D. Wolf Creek Nuclear Operating Corp.
WARREN,C.C. Wolf Creek Nuclear Operating Corp.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 97-008-00: on 970520, concerning ESF & RPS actuation.
Caused by lack of guidance. Engineering disposition to EER
will be revised by 970720.W/970619 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 6
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: Standardized Plant.

05000482

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	PD4-2 PD	1 1	STONE, J	1 1
INTERNAL:	AEOD/SPD/RAB	2 2	AEOD/SPD/RRAB	1 1
	FILE CENTER	1 1	NRR/DE/ECGB	1 1
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EXTERNAL:	L ST LOBBY WARD	1 1	LITCO BRYCE, J H	1 1
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LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

WOLF CREEK GENERATING STATION

DOCKET NUMBER (2)

05000482

PAGE (3)

1 OF 5

TITLE (4)

Manual Reactor Trip Due To A Steam Leak In A Non-Safety Related Third Stage Extraction Steam Isolation Valve.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	20	97	97	008	00	06	19	97	FACILITY NAME	DOCKET NUMBER
OPERATING		1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
			20.402(b)			20.405(c)		X	50.73(a)(2)(iv)	73.71(b)
POWER		82%	20.405(a)(1)(i)			50.36(c)(1)			50.73(a)(2)(v)	73.71(c)
			20.405(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)	OTHER
			20.405(a)(1)(iii)			50.73(a)(2)(i)			50.73(a)(2)(viii)(A)	
			20.405(a)(1)(iv)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)	
			20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME

Richard D. Flannigan
Manager Nuclear Engineering, Safety, and Licensing

TELEPHONE NUMBER (Include Area Code)

1-316-364-4500

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED

MONTH

DAY

YEAR

YES

(If yes, completed EXPECTED SUBMISSION DATE).

X

NO

ABSTRACT:

On Tuesday, May 20, 1997, at 1402, valve AFLV0058C, a non-safety related sixteen inch third stage extraction steam isolation valve, developed a body-to-bonnet steam leak. The steam leak increased to the point that a manual plant trip was initiated at 1457. All rods inserted normally and fully, and all Engineered Safety Features equipment and Reactor Protection System equipment performed as designed. The leak was stopped by shutting the Main Turbine Stop valves. The body-to-bonnet gasket in AFLV0058C was replaced by a new corrugated iron gasket wrapped with graphite tape. No steam cutting or other damage was identified during the rework.

The root cause of the event was the lack of guidance on how to determine minimum and maximum gasket seating stress and corresponding bolt torque values for sheet type gasket materials. Corrective actions included evaluation of other equipment for similar concerns, revision of procedures to provide guidance on providing the correct torque necessary to produce the required gasket stress, and training of Maintenance Planners.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)			PAGE (3)
				YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Wolf Creek Generating Station		05000482		97	008	00	2 OF 5

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Plant Conditions Prior to the Trip:

Operational Status = Mode 1
Reactor Coolant Temperature = 586 degrees Fahrenheit
Reactor Coolant Pressure = 2240 psig
Reactor Power = 82%

Basis for Reportability:

This report is submitted to document a manual actuation of the Reactor Protection System (RPS) [JC] and the Engineered Safety Features (ESF) [JE]. This incident is reportable under 10CFR50.73(a)(2)(iv) which requires the Licensee to report any event or condition that resulted in manual or automatic actuation of an Engineered Safety Feature (ESF), including the Reactor Protection System (RPS).

Description of Event:

On Tuesday, May 20, 1997, at 1402, valve AFLV0058C developed a body-to-bonnet steam leak. Due to a concern relative to the effect of humidity on nearby equipment, and because the leak was not isolatable at power, a manual plant trip was initiated at 1457. All rods inserted fully, and all Engineered Safety Features equipment and Reactor Protection System equipment performed as designed. The leak was stopped by shutting the Main Turbine Stop valves. The body-to-bonnet gasket in AFLV0058C was replaced. A new corrugated iron gasket, wrapped with graphite tape, was installed during re-assembly. No steam cutting or other damage was identified during the rework. An On-the-Spot-Change (OTSC) was issued to maintenance procedure MGM MOOP-08 to indicate that consideration should be given to gasket seating stress when determining joint bolting torque values for joints using sheet gasket materials.

The AFLV0058C valve is a non-safety related, sixteen inch, third stage extraction steam isolation valve. It is an ANSI Class three hundred pound gate valve manufactured by the Crane Co. The valve functions as the isolation valve for the third stage extraction steam supply to the 7B high pressure feedwater heater. It closes automatically on high-high level in the 7B heater, and on a turbine trip. Normal operating temperature (T) and pressure (P) for the valve are approximately 450 F and 435 psig respectively. Crane specifies an asbestos filled corrugated iron body-to-bonnet gasket for the body-to-bonnet connection of this valve.

Engineering Evaluation Request (EER) 89-XX-20, Revision 1, issued in January 1993, approved the generic use of graphite tape and graphite sheet gasket material as additional or stand alone gasket material to aid in sealing flanged connections using spiral wound, flat metal, or metal jacketed gaskets, with the condition that the use of these materials be limited to "extreme" conditions.

In April 1993, the body-to-bonnet gasket of AFLV0058C was replaced with substitute material. Prior to this point in time, the originally specified corrugated iron gasket

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had been installed. No body-to-bonnet leaks had been identified prior to gasket replacement in 1993. The replacement gasket was made from 3/32" Garlock 9800 compressed carbon fiber sheet gasket material.

When the gasket material was changed in 1993, neither the vendor instruction manual for AFLV0058C, nor the vendor print specified a body-to-bonnet bolt torque value. The Work Request used to install the gasket material referenced maintenance procedure MGM MOOP-08 for torque values. The twenty, one and one-eighth inch body-to-bonnet A193 B7 bolts were torqued to 355 foot pounds. This torque corresponds to a bolt stress of 30,000 psi. This resulted in a gasket seating stress of approximately 6,300 psi prior to application of system pressure. System pressure at full plant load reduced the gasket seating stress to approximately 4600 psi. The seating thrust of the Limitorque operator could further reduce the gasket seating stress when the valve was closed. Garlock Engineering recommends that a minimum gasket stress of 5900 psi be provided, and in general, that bolt torque for flanges using sheet gasket materials and A193 B7 bolting be specified, so that gasket seating stress is as close as possible to 15,000 psi without exceeding 60,000 psi bolt stress. Garlock's standard product descriptions did not contain this information on recommended gasket seating stresses prior to 1995. Garlock also recommends using the thinnest possible gasket, as thinner gaskets are less susceptible to blow out because they have a smaller surface exposed to system pressure, and therefore are subjected to a lower outward force.

In order to determine if there are other installations of this material where a similar concern might be present, work histories on other valves supplied under Specification M-244 were performed. In addition, searches were performed on the use of gasket sheet material. From this review, valves potentially utilizing non-metallic compressed gasket material were identified. Further evaluation, based on the valve design, operating parameters, and gasket seating stress, was performed. This review encompassed not only non-safety related components, but also safety related valves.

Root Cause and Corrective Actions:**Root Cause:**

It was concluded that the insufficient body-to-bonnet bolt torque and corresponding gasket seating stress was the cause of the AFLV0058C gasket failure. The type of gasket was changed without adequate consideration of changes in the required gasket seating stress and the effect of this on the required torque values. The reason for this lack of consideration was lack of knowledge, both on the part of Engineering and on Maintenance Planning.

The root cause of the insufficient body-to-bonnet bolt torque, and corresponding gasket stress, was the lack of guidance on how to determine minimum and maximum gasket seating stress and corresponding bolt torque values for sheet type gasket materials. A contributing factor is lack of guidance in MGM MOOP-08 as to how to determine appropriate bolt torque values when using sheet gasket materials.

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Corrective Actions:

Immediate and Remedial Corrective Actions:

- The body to bonnet gasket in AFLV0058C was replaced with a metallic gasket obtained from the valve manufacturer. For additional assurance, the gasket was wrapped with graphite tape and torque values were increased to obtain 60,000 psi bolt stress.
- An OTSC was issued to maintenance procedure MGM MOOP-08 to indicate that consideration should be given to gasket seating stress when using sheet gasket materials.
- Other valves in high energy systems where metal gaskets had been replaced with non-metallic composite gaskets were identified, and gasket seating stresses determined. Based on this review, the gasket in AFLV0044C, fifth stage extraction steam to the 6B feed water heater isolation valve, was replaced prior to restart. Other valves identified in this review were determined to have seating stresses adequate for continued operation until Refuel IX.

Corrective Action to Prevent Recurrence:

- Other equipment in the plant also has composite sheet gasket materials installed, and may not have optimum bolt torque values specified. In order to determine other installations of this material where a similar concern would be present, an evaluation was performed on a case-by-case basis to determine those valves in a high temperature or high pressure application which might have marginal gasket seating stress. Valves identified in this review shall have their body-to-bonnet gaskets replaced prior to restart from Refuel IX.
- In addition, many of the low pressure feedwater heaters and both heater drain pumps also have sheet gasket material installed. These need further evaluation to determine if gasket replacement is necessary. Evaluation of these feedwater heater manway and heater drain pump gaskets to determine if replacement is necessary will be completed by August 20, 1997.
- MGM MOOP-08 will be revised to provide more guidance on how to determine appropriate torque values when using composite sheet gasket. This revision will be completed by August 20, 1997.
- The changes to MGM MOOP-8 will be reviewed with the Mechanical Maintenance Planners and the Master Mechanics by September 20, 1997.
- The engineering disposition to Engineering Evaluation Request (EER) 89-XX-20 will be revised by July 20, 1997, to provide more guidance on the use of composite sheet gasket material.

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Safety Significance:

This event resulted in a manual reactor trip. Although the leak was sudden and severe, and could have caused a problem with personnel safety, no one was injured. There were no adverse effects on plant equipment because of the trip, the event had minimal safety significance.

Other Previous Occurrences:

There were no previous occurrences of this type at Wolf Creek Generating Station.